IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	:	Examiner: Fred L. Braun
YASUMASA OTSUKA, ET AL.	)	
	:	Group Art Unit: 2852
Application No.: 10/091,467	)	
	:	
Filed: March 7, 2002	)	
	:	
For: HEATER HAVING METALLIC SUBSTRATE AND IMAGE HEATING APPARATUS USING HEATER	)	November 12, 2003

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUBMISSION OF SWORN TRANSLATION OF PRIORITY DOCUMENT AND EVIDENCE ESTABLISHING COMMON OWNERSHIP OF PRESENT APPLICATION AND MUROOKA ET AL.

Sir:

Applicants submit herewith a sworn English translation of Japanese Patent Application No. 2001-068653, thereby perfecting Applicants' claim to priority.

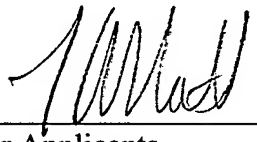
By way of submission of the sworn translation of the priority document, Applicants have removed Murooka et al. (U.S. Patent No. 6,583,389) as a reference under 35 U.S.C. §102(a) and this reference now qualifies as prior art only under subsection (e) of §102 of Title 35.

Applicants submit that the present application and Murooka et al. were, at the time the present invention was made, owned by, or subject to an obligation of assignment to, the

same person, namely Canon Kabushiki Kaisha. Accordingly, in pursuant to 35 U.S.C. §103(c), Murooka et al. is not applicable prior art against the claims of the present application for purposes of obviousness under 35 U.S.C. §103(a).

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,



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DECLARATION

I, SEIICHIRO TAKAHASHI, a Japanese Patent Attorney registered No. 10740, of Okabe International Patent Office at No. 602, Fuji Bldg., 2-3, Marunouchi 3-chome, Chiyoda-ku, Tokyo, Japan, hereby declare that I have a thorough knowledge of Japanese and English languages, and that the attached pages contain a correct translation into English of the priority document of Japanese Patent Application No. 2001-068653 filed on March 12, 2001 in the name of CANON KABUSHIKI KAISHA.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made, are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed this 5th day of November, 2003

Seiichiro Takahashi

SEIICHIRO TAKAHASHI

PATENT OFFICE
JAPANESE GOVERNMENT

This is to certify that the annexed is a true copy of the following application as filed with this Office.

Date of Application: March 12, 2001

Application Number: Japanese Patent Application No. 2001-068653

Applicant(s): CANON KABUSHIKI KAISHA

April 5, 2002

Commissioner,
Japan Patent Office KOZO OIKAWA

(Seal)

Certificate No. 2002-3024448

2001-068653

[Name of the Document] Patent Application

[Reference No.] 4397175

[Date] March 12, 2001

[Addressed to] Commissioner of the Patent Office

[International Classification] G03G 15/20 101

[Title of the Invention] Heating Body and Heating Apparatus

[Number of the Claims] 5

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[Indication of Official Fee]

[Prepayment Ledger No.] 009623

[Amount] 21,000

[List of Filed Materials]

[Material]	Specification	1
[Material]	Drawings	1
[Material]	Abstract	1
[General Power of Attorney]	9703877	
[Proof Requirement]	Required	

[Document Title] SPECIFICATIONS (068653/2001)

[Title of the Invention]

HEATING BODY AND HEATING APPARATUS

[Claims]

1. A heating body characterized in that an insulating glass layer is formed on a curved metallic substrate, in that a resistor pattern, a conductive pattern and an electrode are formed on the glass layer, and in that a glass layer is further formed thereon.

2. A heating apparatus characterized by a curved heating body, a support member for supporting the heating body, a film, which is structured by forming an elastic layer on a resin substrate, contains the support member for supporting the heating body and rotates in sliding contact with a surface of the heating body, and a pressure member for pressing the heating body through the film, wherein a heating process is performed by passing a heated member between the film and the pressure member.

3. A heating apparatus according to Claim 2, characterized in that the heating body is structured by forming an insulating glass layer on a curved metallic substrate, forming a resistor pattern, a

conductive pattern and an electrode on the glass layer, and further forming a glass layer thereon.

4. A heating apparatus according to Claim 2 or 3, characterized in that the resin substrate of the film is made of any of polyimide, polyamide, and polyamideimide.

5. A heating apparatus according to any one of Claims 2 to 4, characterized in that the elastic layer on the film is made of silicone rubber or fluororubber, and a surface layer is formed by a fluororesin layer such as PFA, PTFE, FEP or the like.

[Detailed Description of The Invention]

[0001]

[Technical Field of the Invention]

The present invention relates to a heat-fixing apparatus in an image formation apparatus such as an electrophotographic type or an electrostatic recording type printer, a copying machine or the like, a heating apparatus for dry in an inkjet printer or the like, a heating body used in other various heating apparatuses and a heating apparatus using the heating body.

[0002]

[Conventional Art]

Conventionally, a heat roller type heating device has been extensively used in a device for heat-fixing processing as a permanently fixed image on a recording material surface an unfixed toner image corresponding to target image information formed in a direct manner or an indirect (transfer) manner on a surface of a recording material (an electro-facsimile sheet, an electrostatic recording sheet, a transfer material sheet, a printing sheet or the like) by using toner made of thermally meltable resin or the like by suitable image forming process means such as an electrophotographic recording technology, an electrostatic recording technology, a magnetic recording technology or the like, i.e., a heat-fixing apparatus in an image forming apparatus such as a copying machine, a printer, a facsimile or the like using, for example, an electrophotographic system.

[0003]

The above-described heat roller type is basically composed of a roller made of metal and provided therein with a heater and a pressure roller having elasticity, which is brought into a press-contact with the roller. The recording material is caused to pass through a fixing nip portion defined by a pair of these rollers, whereby an unfixed toner image borne on the recording material is heated and

pressurized to be fixed.

[0004]

Also, the present applicant previously proposes a film heating type heating device in Japanese Patent Application Laid-open No. 63-313182 or the like.

[0005]

According to this film heating system, a heater (heating pair) and a heated member are respectively brought into contact with one side and the other side of a heat resistant film so that a thermal energy of the heater is given to the heated member via the heat resistant film. It is possible to use a film or a heater having a low heat capacity. Accordingly it is possible to shorten wait time (quick start, on-demand fixing) in comparison with the conventional heat roller type heating device.

[0006]

Also, the quick start is possible to thereby dispense with preheat upon the non-printing operation and it is possible to save electric power in a total sense.

[0007]

Fig. 6 is a schematic structural model view (cross-sectional model view) of a typical example of a heat-fixing apparatus using a film heating system. This apparatus is composed of a ceramic heater 7 as a heating body, a stay 13 that is a support member for

supporting and insulating the heater 7, a cylindrical film 12 made of heat resistant resin, which surrounds loosely the stay 13 for supporting the heater 7, a pressure roller 9 being in press-contact with the heater 7 with the film 12 interposed therebetween for defining a nip portion N, and the like.

[0008]

The pressure roller 9 is rotated in a counterclockwise direction indicated by the arrow by drive means M. With the rotation of the pressure roller 9, a rotary force is applied to the film 12 by a frictional force between the pressure roller 9 and the film 12 in the nip portion N so that the film 12 is kept under the condition that it is accordingly caused to rotate in the clockwise direction indicated by the arrows about the stay 7 with its inner surface in sliding contact with the heater 7 surface. The stay 13 serves also as a guide member for the rotating film 12.

[0009]

Under the condition that the pressure roller 9 is drivingly rotated, the film 12 is driven in accordance with this rotation and an electric power is fed to the heater 7 so that it is heated to a predetermined fixing temperature under the control, a recording material P to be fixed with an image as the heated member to be conveyed from a recording portion

of an image forming apparatus (not shown) is introduced between the film 12 of the nip portion N and the pressure roller 9 to be conveyed while being clamped together with the film 12 through the nip portion N, whereby the heat of the heater 7 is given to the recording material P via the film 12 to soften an unfixed image (toner image) t to the surface of the recording material P to perform the heat fixing of it. The recording material P that has passed through the nip portion N is conveyed and separated in accordance with its curvature in order from the surface of the film 12. In order not to adhere the unfixed toner on the surface of the film 12, a heat resistant releasing layer made of fluorine resin or the like that is superior in releasing property is provided thereon.

[0010]

Fig. 7 is a view showing a structural example of the ceramic heater 7 as a heating body. (a) is a schematic partially fragmental plan view of a front surface side of the heater. (b) is a schematic plan view of a rear surface side of the heater. (c) is an enlarged cross-sectional, schematic view of the heater.

[0011]

The heater 7 is formed by laminating and baking in order by a screen printing technology a resistor

pattern 2 heated by feeding electric power, a folded electrode 6, a power feeding electrode 5, a conductive pattern 5a that is an extended portion of the power feeding electrode 5 and a surface protective glass layer 3 on the front surface side of a ceramic substrate 1 such as alumina, aluminum nitride, silicon carbide or the like. A temperature detecting element (thermistor or the like) 4 is provided on the rear surface side of the ceramic substrate 1.

[0012]

A power supply (AC input) is performed to the resistor pattern 2 through the power feeding electrode 5 and the conductive pattern 5a from a power feeding circuit (not shown) to thereby rapidly elevate a temperature of the heater 7 as a whole.

[0013]

For the temperature control of the heater 7, the temperature detecting element 4 is brought into contact with a rear surface of the heater 7 so that the temperature is outputted as a voltage and furthermore, the output is calculated by a control circuit (not shown) such as a CPU to thereby adjust the AC input to the heater 7.

[0014]

[Problems to be solved by the Invention]

In recent years, color printers have been widely

used. Therefore, a method of expressing various colors by laminating toners of plural colors has been widely performed.

[0015]

In this case, in a heat-fixing apparatus corresponding to a heating apparatus (Fig. 6) of a conventional film heating system, since a film has rigidity, there occurred such a problem that toners themselves are not sufficiently mixed in their colors. Especially, on an overhead projector sheet (OHT), if boundary of particles of toners remains, the light is scattered, and there remarkably occurs such a problem that an image is expressed by the dark color.

[0016]

According to the kind of sheets, if a post card of Japanese paper of which a surface has a rough texture or a coverbond sheet is used, a film cannot be fitted to an uneven surface, and there occurred such a problem that even a single color toner resulted in causing unevenness in its fusion.

[0017]

The present invention provides a heating body for a heating apparatus, an improved film heating type heating apparatus which can solve the above-mentioned problems. As to a heat-fixing apparatus, the present invention provides a heating apparatus, which can improve an on-demand fixing and can be

applied to a color printer (color LBP), capable of saving energy and realizing an excellent image quality.

[0018]

[Means for solving the Problems]

The present invention provides a heating body and a heating apparatus characterized in the following structure.

[0019]

(1) A heating body characterized in that an insulating glass layer is formed on a curved metallic substrate, in that a resistor pattern, a conductive pattern and an electrode are formed on the glass layer, and in that a glass layer is further formed thereon.

[0020]

(2) A heating apparatus characterized by a curved heating body, a support member for supporting the heating body, a film, which is structured by forming an elastic layer on a resin substrate, contains the support member for supporting the heating body and rotates in sliding contact with a surface of the heating body, and a pressure member for pressuring the heating body through the film, wherein a heating process is performed by passing a heated member between the film and the pressure member.

[0021]

(3) A heating apparatus according to the above item (2), characterized in that the heating body is structured by forming an insulating glass layer on a curved metallic substrate, forming a resistor pattern, a conductive pattern and an electrode on the glass layer, and further forming a glass layer thereon.

[0022]

(4) A heating apparatus according to the above item (2) or (3), characterized in that the resin substrate of the film is made of any of polyimide, polyamide, polyamideimide.

[0023]

(5) A heating apparatus according to any one of the above items (2) to (4), characterized in that the elastic layer on the film is made of silicone rubber or fluororubber, and a surface layer is formed by a fluororesin layer such as PFA, PTFE, FEP or the like.

[0024]

(Operation)

In the present invention, there are two important technical factors in solving the above-mentioned problems.

[0025]

(1) Curved heating body (Curved heater)

In this kind of conventional heating device, a ceramic heater using an alumina or the like as a

heating body has been used. However, the device has suffered from problems in that the ceramic is fragile, a cost is high, the ceramic is not suitable for bending machining or the like.

[0026]

Therefore, the present applicant proposes a heating device using a metal plate as substrate for heating body in Japanese Patent Application Laid-open Nos. 9-244442 and 10-275671 in advance. In this heating device, as a heating body, an insulating layer is formed on a metallic substrate to form the same substrate having the insulating property as the conventional ceramic substrate and a resistor pattern, a conductive pattern and an insulating sliding layer as an uppermost layer are formed thereon.

[0027]

However, in these proposals, there is no description about a process of bending the heating body into a shape of curved surface.

[0028]

The merit of bending a heating body surface into a shape of curved surface is to improve the sliding property of a film. That is, in the above-mentioned conventional apparatus shown in Fig. 6, the load for driving a film 12 increases due to a process of deforming the film 12 into a plane shape in a nip portion N. Especially, if the film 12 is structured

in that an elastic layer is provided on a heat resistant resin substrate, the rigidity increases. Therefore, an unnecessary deformation of causing an increase of torque is not preferable.

[0029]

(2) Film

As a film, by structuring that an elastic substance is laminated on the heat resistant resin substrate, it becomes possible to perform the heating in such a manner of containing a toner image. Therefore, even in case of an overhead projector sheet, a color image can be projected with a state of finely mixing colors.

[0030]

Even in case of a white/black image, an image of not having unevenness in glossy can be obtained without selecting the kind of sheets.

[0031]

[Embodiments]

(Embodiment 1)

Fig. 1 shows a schematic structural model view (cross-sectional model view) of a heating apparatus in accordance with an embodiment of the present invention.

[0032]

A heating apparatus according to this embodiment is a pressure roller drive type and film heating type

heat-fixing apparatus using a cylindrical (endless type) film basically in the same manner as in the apparatus described in conjunction with Fig. 6. The same reference numerals are used to indicate the like components or members to thereby avoid the duplication of explanation.

[0033]

The heating apparatus according to this embodiment is characterized in that a curved heater having a substrate made of metal is used as a heating body 8 and that a film provided with an elastic layer is used as a film 21.

[0034]

(1) Curved Heater 8

Figs. 2 is a structural view of the curved heater 8 according to this embodiment. (a) is a perspective view showing a front surface side of the curved heater 8, (b) is a perspective view showing the heater in such a state that a surface protective glass layer has been removed, and (c) is an enlarged cross-sectional schematic view.

[0035]

Reference numeral 16 denotes a curved metallic substrate (electric conductive substrate) of the heater 8, which is made of metal or the like such as SUS430 that is likely to be identified with the glass in thermal expansion coefficient. A dimension of the

metallic substrate 16 is, for example, a length of 270 mm, a radius of curvature of 12 mm, a circumferential length of 20 mm, and a thickness of 0.6 mm.

[0036]

An insulating glass layer 15 is formed over almost all the front surface of the metallic substrate with the convex surface side of the metallic substrate 16 used as a front surface side. Over its surface, a resistor pattern 2, a folded electrode 6, a power feeding electrode 5, a conductive pattern 5a that is an extended portion of the power feeding electrode 5 and a surface protective glass layer 3 are laminated and baked in order by screen printing. A temperature detecting element (thermistor or the like) 4 is provided on a rear surface side of the metallic substrate 16.

[0037]

It is preferable that the thickness of the metallic substrate 16 be in the range of 0.5 mm to 2 mm. If it is too thin, a large warpage is generated due to the difference in thermal expansion coefficient after printing and it is difficult to perform the assembling work. Also, if it is too thick, the heat capacity of the heater 8 is increased and in the case where the temperature detecting element 4 such as a thermistor is brought into contact from the

rear surface, the response is delayed so that the desired control becomes difficult to perform. This causes generation of image problems such as fixing fault, non-uniformity in gloss, offset or the like.

[0038]

As shown in Fig. 3, a squeegee 17 is fixed and the metallic substrate 16 is rotated under a screen 18 mounted on stages 20a and 20b while moving the screen 18 so that paste 19 for forming each pattern layer is supplied in a method of printing the resistor pattern 2, the folded electrode 6, the power feeding electrode 5, the conductive pattern 5a that is the extended portion of the power feeding electrode 5 and the surface protective glass layer 3 on the substrate 16 having a curved surface.

[0039]

It is preferable that the thickness of the insulating glass layer 15 be in the range of 30 microns to 100 microns in order to have a resistance to voltage that is not smaller than 1.5 kV, and it is preferable to take a method of printing a plurality of times in order to avoid the pin holes. Also, in order to enhance the adhesion between this insulating glass layer 15 and the metallic substrate 16, it is preferable to roughen the metallic substrate 16 by sand blasting or etching and print the insulating glass layer 15 after degreasing. Since this

insulating glass layer 15 has a function not only to provide the voltage resistance but also to prevent the heat generated in the resistor pattern 2 from escaping toward the substrate 16, it is preferable that the heat conductivity be not higher than 2 W/(m K).

[0040]

The resistor pattern 2, the folded electrode 6, the power feeding electrode 5 and the conductive pattern 5a that is the extended portion of the power feeding electrode 5 are printed on this insulating glass layer 15.

[0041]

The surface protective glass layer 3 is printed as the uppermost layer. The surface protective glass layer 3 requires the smoothness for the sliding property with the film 12, the insulating property and the high heat conductivity (preferably, 2W/(m K).

[0042]

These glass layers and resistor patterns are baked to be formed after printing by using screen printing in the same manner as in the conventional ceramic heater. The resistor pattern 2 requires such a length that it may contain paper having a maximum size to be passed therethrough.

[0043]

(2) Film 21

As shown in the layer structural model view of Fig. 3, the film 21 is a three-layer film of a heat resistant resin substrate 21a made of polyimide, polyamide, polyamideimide or the like, an elastic layer 12b made of silicone rubber, fluororubber, or the like, and a releasing layer (surface layer) 12c made of fluororesin such as PFA, PTFE, FEP or the like.

[0044]

More specifically, in this embodiment, the polyimide was formed into a cylinder having a thickness of 40 microns, a length of 230 mm and an inner diameter of 24 mm as the heat resistant resin substrate 21a. Thereafter, silicone rubber in a liquid form (having JIS-A hardness not less than 5 degrees) was coated so as to have a thickness of 100 im on an outer surface of the cylindrical resin substrate 21a by a roll coater or the like without removing it away from molds. Thereafter, the substrate was thermally cured for 30 minutes at 130℃. Subsequently, the substrate was subjected to a secondary vulcanization for four hours in an oven set at 200℃ to form a silicone rubber layer as the elastic layer 21b having a thickness of 0.5 mm.

[0045]

The surface of the silicone rubber layer was subjected to a predetermined primer process

(GLP103SR: Daikin Industries, Ltd). Thereafter, fluorine rubber latex (GLS213: Daikin Industries, Ltd.) was sprayed and coated as the releasing layer 21c and dried at 70℃. Thereafter, it was baked for thirty minutes in an oven set at 310℃ to form a surface layer having a thickness of about 30 ìm. As a result, it was possible to form a good releasing layer with the surface layer of fluorine resin in the fluorine rubber latex having about 1 to 3 ìm.

[0046]

The thus produced heater 8 and the film 21 were attached to the heating apparatus as shown in Fig. 1.

[0047]

Silicone rubber (JIS-A hardness of 14 degrees) was formed with a thickness of 3 mm as the elastic layer 22 on a core metal 10 (having a diameter of 14 mm) for the pressure roller 9. Thereafter, the surface of the silicone rubber layer 22 was subjected to a predetermined primer process (GLP103SR: Daikin Industries, Ltd). Thereafter, fluorine rubber latex (GLS213: Daikin Industries, Ltd.) was sprayed and coated as the releasing layer 23 and dried at 70℃. Thereafter, it was baked for thirty minutes in an oven set at 310℃ to form a surface layer 23 having a thickness of about 30 ìm. As a result, it was possible to form a good releasing layer with the surface layer of fluorine resin in the fluorine

rubber latex having about 1 to 3 im.

[0048]

This pressure roller 9 was pressurized at 150 N in total and rotated to thereby drive the film 21. As a result, it was possible to obtain the heating apparatus that might mix colors even for an OHT sheet well up to the conveyance velocity of 100 mm/sec of the recording material P that was a member to be heated.

[0049]

The heating body 8 was formed into a curved heater to thereby enhance the sliding property with the film 21 and to thereby reduce the load or torque for driving the film 21. It was possible to heat the toner image so as to surround the toner image by laminating the elastic layer 21b on the heat resistant resin substrate 21a as the film 12. As a result, the mixture of color was improved. It was possible to project the color image even onto the overhead projector sheet. Also, it was possible to obtain the image having no non-uniformity in gloss regardless of the kind of sheet even for the monotone image.

[0050]

(Embodiment 2)

In the above-described Embodiment 1, the heating body (heater) 8 is formed into a plate-like curved

surface. However, a heating body (heater) 8 according to this embodiment takes a cylindrical shape as shown in Fig. 5. Namely, the metallic substrate 16 is formed into a cylindrical shape. Then, the insulating glass layer 15, the resistor pattern 2, the folded electrode 6, the power feeding electrode 5, the conductive pattern 5a that is the extended portion of the power feeding electrode 5 and the surface protective glass layer 3 are printed and backed on the outer surface of this cylindrical metallic substrate 16 in the same manner as in Embodiment 1.

[0051]

The heater is formed into a cylindrical shape so that the heater is used as a support member (stay) for pressurizing to thereby simplify the structure.

[0052]

Also, since the region in which the area of the resistor pattern 2 may be adjusted as desired is increased, it is possible to cope with the high speed operation.

[0053]

Conventionally, a surface heat generating type roller has been proposed, but it requires the uniform heating in any part of the circumferential direction. However, in accordance with this embodiment, as shown in Fig. 5, the heating region H is expanded toward the upstream side of the nip portion N as desired but

is not intended to uniformly heat the circumferential direction of the cylindrical metallic substrate 16 as a whole. Also, the cylindrical heating body 8 per se is fixed but not rotated. There are a small number of appendixes such as a bearing or a gear and the heat capacity is small.

[0054]

(Another Embodiment)

(1) It is a matter of course that the heating apparatus according to the present invention is not limited to the heat-fixing apparatus according to the embodiments. Further, it is a matter of course that the present invention may be extensively applied to, for example, an image heating apparatus for improving the surface property such as gloss by heating the recording material bearing an image, an image heating apparatus for prefixing, a heating apparatus for performing the feeding, drying, laminating, and heat pressing for removing creases of the sheet-like member, a heating apparatus for drying used in an ink jet printer or the like.

[0055]

(2) Also, it is a matter of course that a structure of the heating apparatus per se to which the heating body according to the present invention is applied is not limited to an apparatus of film heating type shown in the embodiments.

[0056]

[Effect of the Invention]

As explained above, according to the present invention, it becomes possible to provide an improved heating body for a heating apparatus and an improved film heating type heating apparatus. As to a heat-fixing apparatus, it becomes possible to provide a heating apparatus, which can improve an on-demand fixing and can be applied to a color printer (color LBP), capable of saving energy and realizing an excellent image quality.

[Brief Description of the Drawings]

Fig. 1 is a schematic structural model view of a heating apparatus (a heat-fixing apparatus of film heating type) in the first embodiment of the present invention;

Figs. 2 is a structural view for explaining a curved heating body;

Fig. 3 is a view for schematically explaining a printing formation of a structural layer of the heating body;

Fig. 4 is a layer structural model view of a film;

Fig. 5 is a schematic structural model view of a heating apparatus in the second embodiment;

Fig. 6 is a schematic structural model view of a

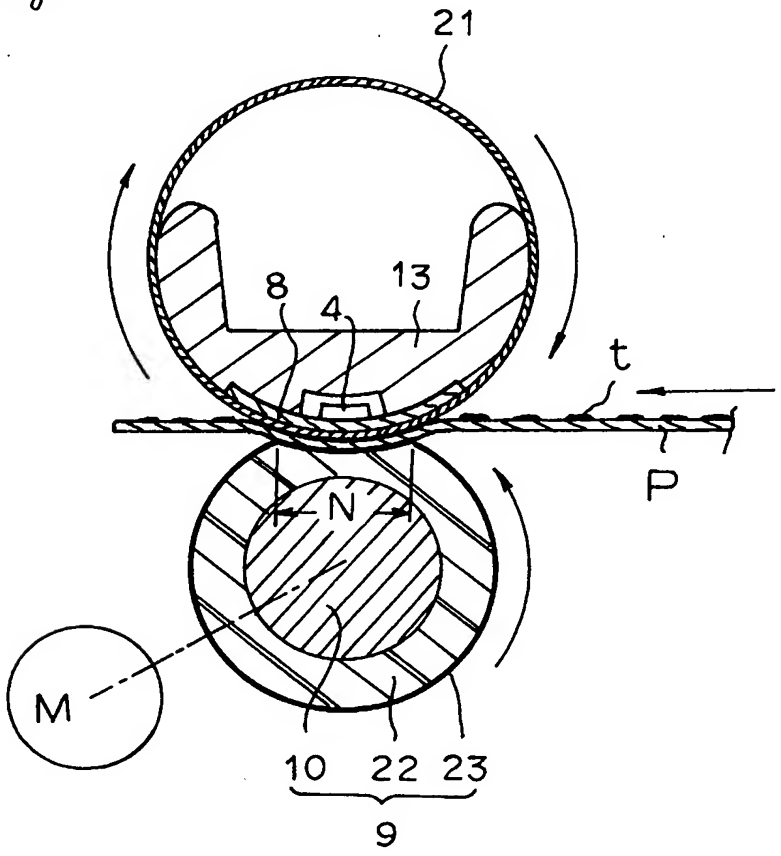
heating apparatus (a heat-fixing apparatus of film heating type) in a conventional example; and

Fig. 7 is a view for explaining the structure for one example of a ceramic heater.

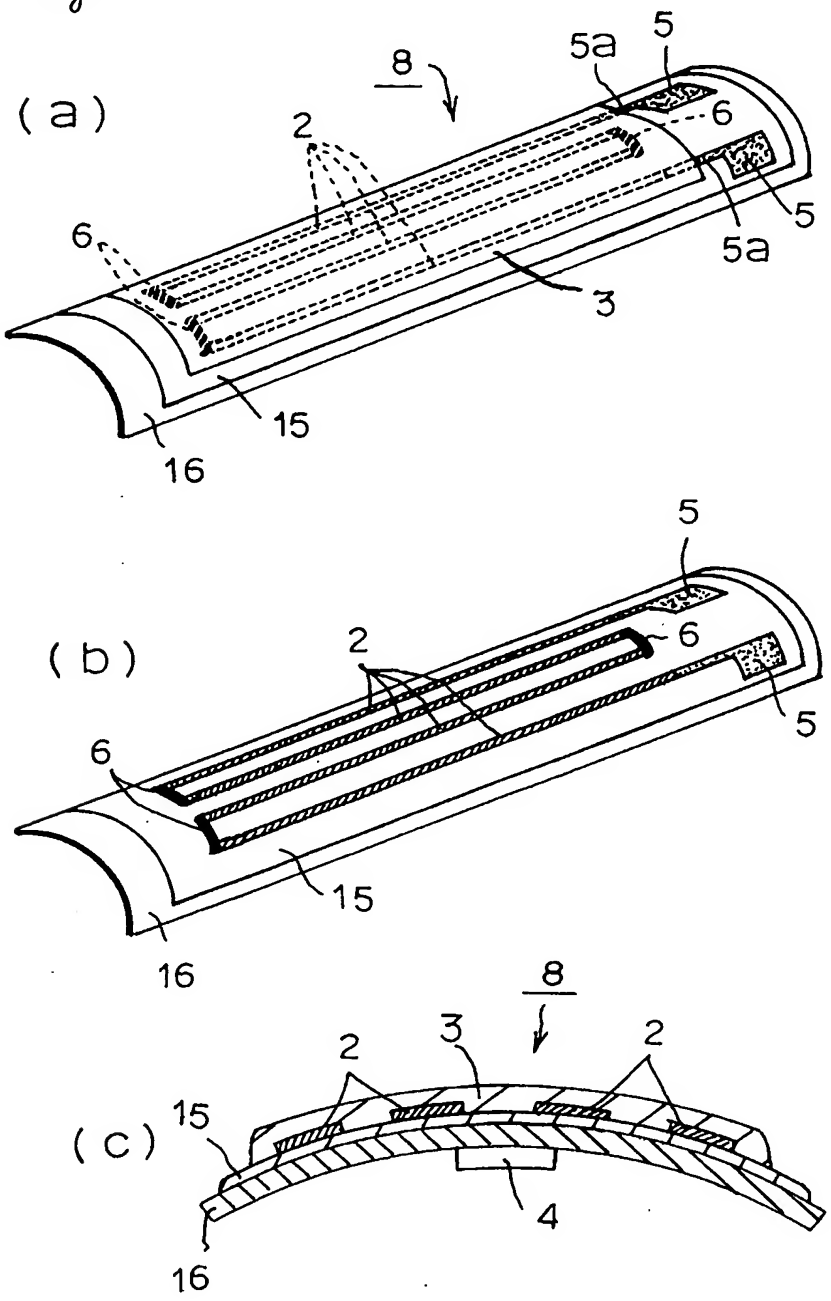
[Description of the Reference Numerals]

1: ceramic substrate
2: resistor pattern
3: protective glass
7: ceramic heater
t: toner
P: recording material
12: film
13: stay
15: insulating glass
16: metallic substrate
8: curved heater
21: film having elastic layer

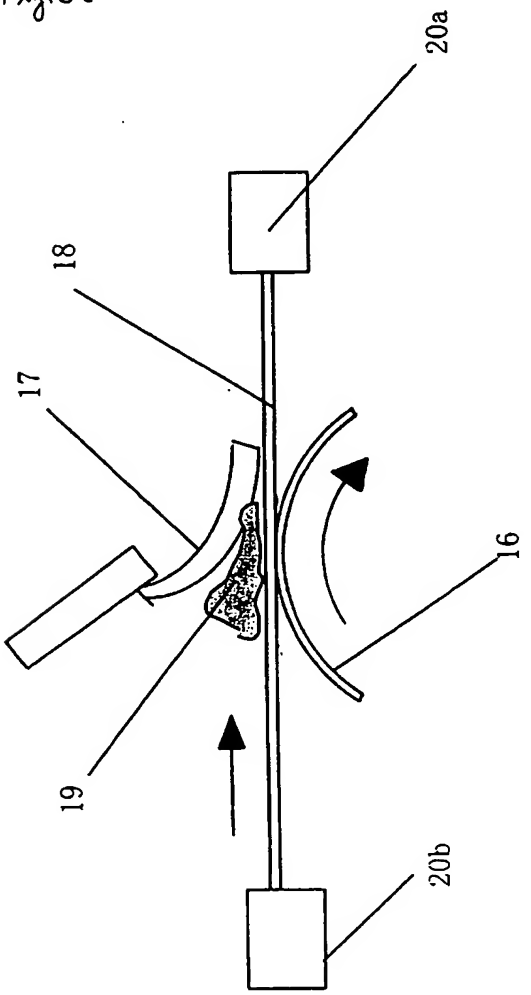
【書類名】　図面　Drawings
[Document Title]
【図１】
[Fig.1]



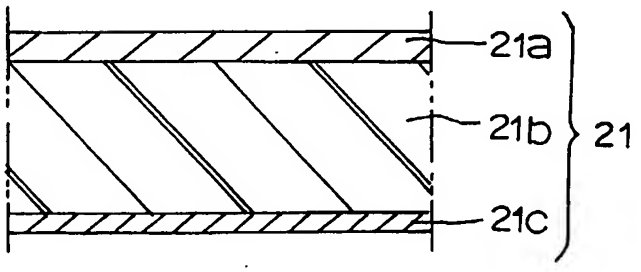
【図２】
[Fig.2]



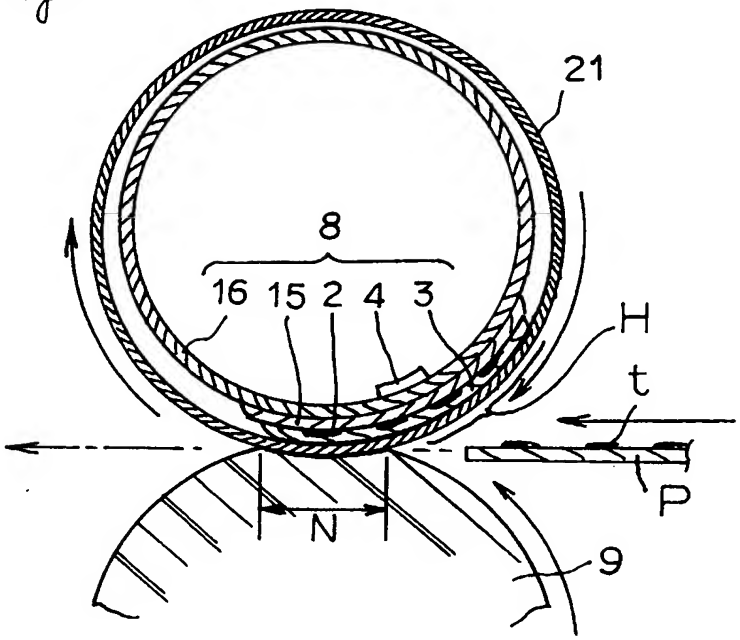
【図３】
[Fig.3]



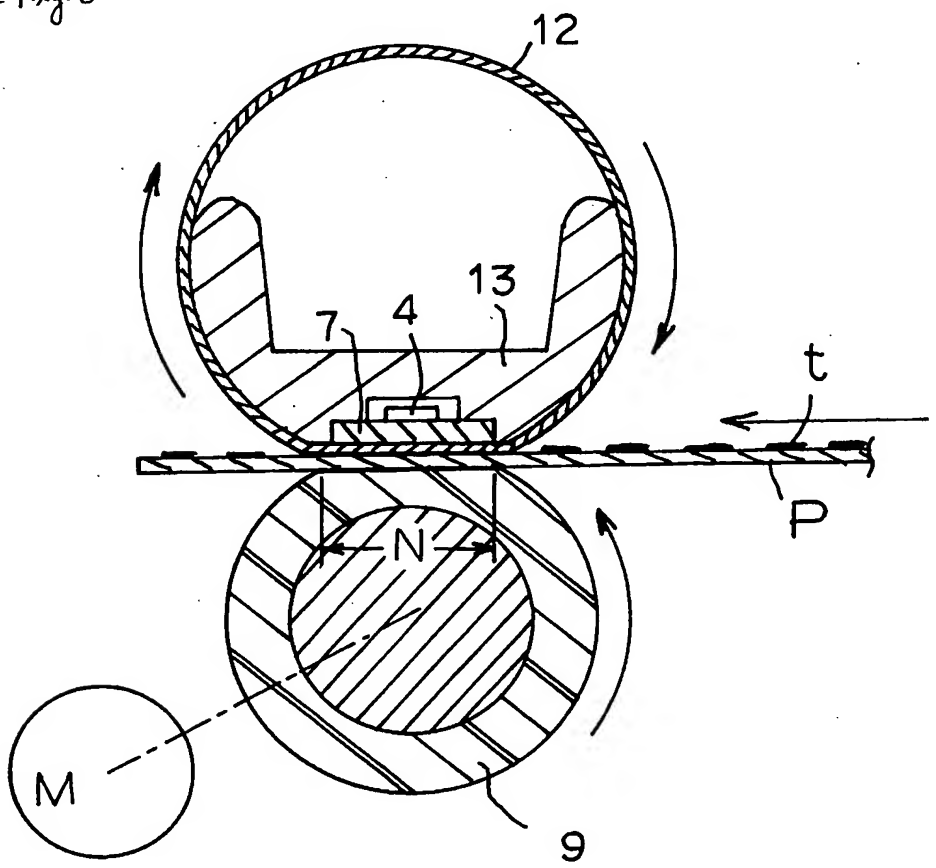
【図４】
[Fig.4]



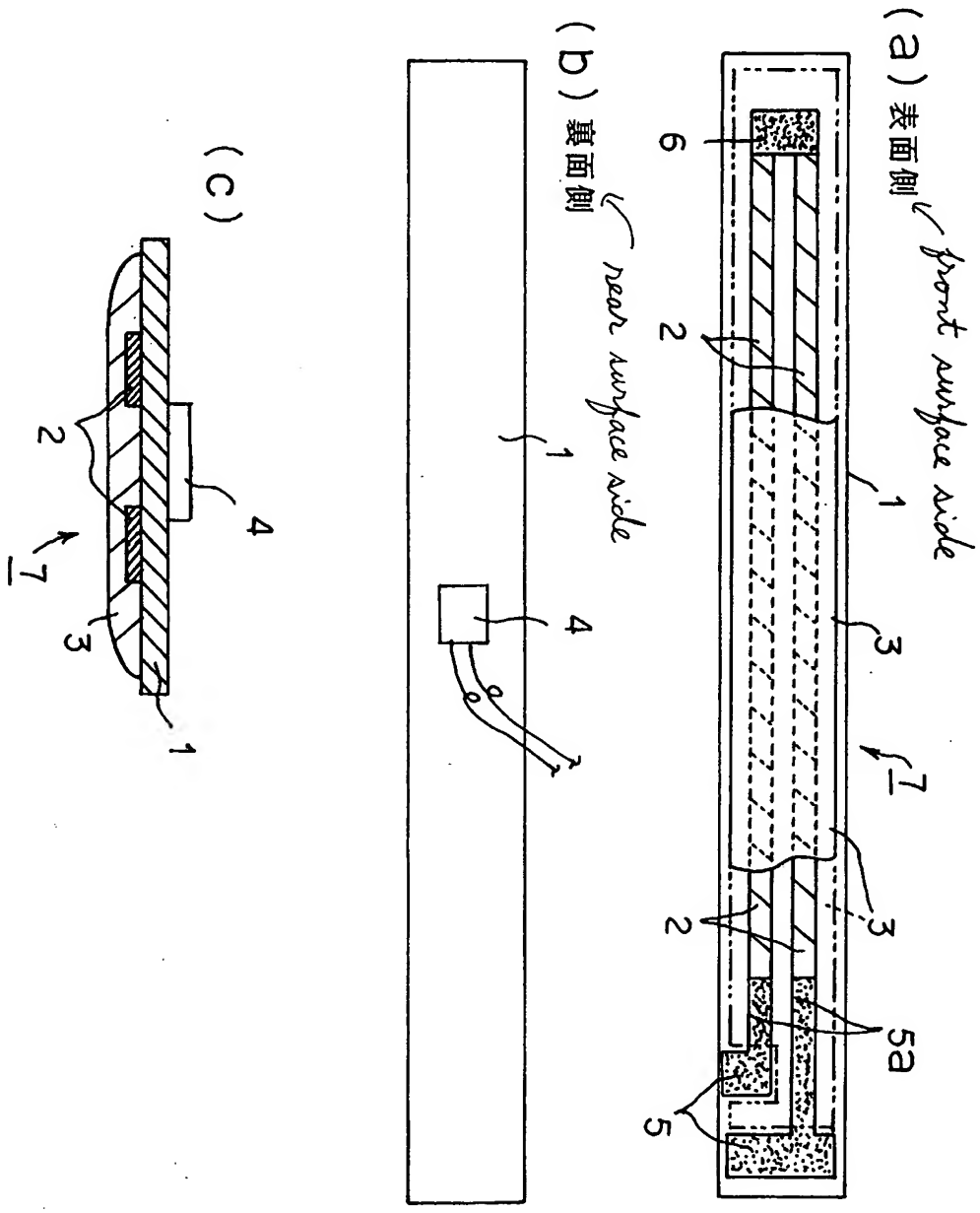
【図５】
[Fig.5]



【図６】
[Fig.6]



【図７】
[Fig.7]



[Document Title] Abstract

[Abstract]

[Problem]

It is an object to provide a heating apparatus, which can improve an on-demand fixing and can be applied to a color printer, capable of saving energy and realizing an excellent image quality.

[Solving Means]

A heating apparatus is characterized by a curved heating body 8, a support member 13 for supporting the heating body 8, a film 21, which is structured by forming an elastic layer on a resin substrate, contains the support member 13 for supporting the heating body 8 and rotates in sliding contact with a surface of the heating body, and a pressure member 9 for pressuring the heating body 8 through the film 21, wherein a heating process is performed by passing a heated member P through N between the film 21 and the pressure member 9. The heating body 8 is structured by forming an insulating glass layer on a curved metallic substrate, and forming a resistor pattern, a conductive pattern and an electrode on the glass layer, and further forming a glass layer thereon.

[Selective Drawing] Fig. 1

2001-068653

Applicant's Information

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	[Reason for Change]	New Registration
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